
XXXII. *Description of a Fossil Alcyonium, from the Chalk Strata near Lewes, in a Letter to A. B. Lambert, Esq. F.R.S. V.P.L.S. By Mr. Gideon Mantell, F.L.S.*

Read June 7, 1814.

DEAR SIR,

I BEG leave, with the utmost diffidence, to submit the following observations to the learned Society of which I have the honour of being a member, convinced that it will receive with indulgence any attempt to elucidate the natural history of secondary fossils.

The *Alcyonite* which forms the subject of the present communication is, I believe, peculiar to the upper or flinty chalk in the vicinity of Lewes; it never occurs in any other stratum, and there is every reason to conclude that it obtains the same situation in the hills of Wiltshire. I am not aware of any author having noticed this interesting fossil, unless the funnel-shaped fossils found by M. Guettard at Verest and Touraine, and those described in the second volume of Mr. Parkinson's admirable work on "Organic Remains," are of this species. The specimens which occur at Lewes, though generally considered as *Alcyonia*, do not entirely conform to the character of that genus as given by modern writers; yet, being evidently very nearly allied to it, the Society will, perhaps, permit me to extend the character, so as to allow these fossils a temporary admission, till future discoveries shall point out more precisely their situation in the scale of animated nature.

ALCYONIUM

ALCYONIUM CHONOIDES*.

Funnel-like Alcyonium.

CHAR. GEN. Animal plantiforme, carnosum, gelatinosum, spongiosum, vel coriaceum, cellulis vel tubulis repletum. Superficies poris seu osculis hydras tentaculatas oviparas exserentibus, pertusa. Stirps fixa.

CHAR. SPEC. A. infundibuliforme, superficie interiore tubulorum extremitates apertas exteriori fibras reticulatas exhibente.

From an attentive examination of the mineralized remains of the *Alcyonium*, it is certain that the recent animal possessed great powers of contraction and expansion, which enabled it to assume various dissimilar forms. In a quiescent state it was more or less funnel-like, when partly expanded cyathiform, and when completely dilated it presented the figure of a broad circular disk. To this versatility of shape is to be attributed the great diversity of appearance observable in its reliquiæ, whose forms must have been derived from the contracted or expanded state of the original at the period of its introduction into the mineral kingdom. Without the knowledge of this fact, fossils originating from the same prototype are liable to be considered as distinct species, since it is by the possession of numerous specimens only that the true character of this zoophyte can be ascertained.

That the animal enjoyed the powers of contraction and expansion above ascribed to it, will appear evident from an investigation of its structure. The epidermis, or external coat, is composed of fasciculi of muscular fibres, which, arising from the pedicle, proceed in a radiated manner toward the circumference, and, by frequently anastomosing, constitute a retiform

* à *χώνη*, infundibulum.

plexus capable of dilating, lengthening, and contracting, according to the impressions it received. The fasciculi are further connected by lateral processes, which increase the firmness and coherence of the external integument. From the inner surface of the muscular envelopment arise innumerable tubuli, which pass direct to the ventricular cavity, and terminate in openings on its surface. In some specimens a substance of a sponge-like appearance fills up the interstices between the tubuli, and probably is the remains of a membrane, which served in the recent animal to connect the tubes and assist in strengthening and uniting the whole mass. The sides of the ventricular cavity are generally about one-third of an inch in thickness. From the basis or pedicle proceed fibres by which the animal was attached to its appropriate habitation. These facts beautifully illustrate the anatomy and physiology of the funnel-like *Alcyonium*. We find it possessing a structure, simple yet admirable, and well adapted for the purposes of its existence; an external muscular coat, which enabled it to perform its requisite motions, and a ventricular cavity with an absorbing surface, by which nutrition was effected. We have, in short, the organs which Richerand considers as characteristic of zoophytal animation. "The zoophyte, whose name indicates an animal plant, is totally separated from all beings of the vegetable kingdom, by the existence of a cavity in which alimentary digestion is carried on; a cavity by the surface of which is an absorption, an imbibition, far more active than that which takes place by the external surface of the body.—We find a tube of soft substance, sensible and contractile in all its parts. Moisture oozes from the internal surface of the tube, softens and digests the aliments which it finds there; the whole mass draws in nourishment from it; the tube then spontaneously contracts, and casts out the residue of digestion." *Richerand's Physiology*, pp. 8 and 13.

The preceding remarks demonstrate that much analogy exists between the *Alcyonium Chonoides* and the "funnel-formed fossils" described by Mons. Guettard and Mr. Parkinson. Figure 5, Tab. xi. of the second volume of *Organic Remains*, approaches very nearly to this species. At page 127 it is mentioned as "being of a funnel-shape, and formed of innumerable tubuli extending horizontally from the inner to the outer surface; their bases being on the outer, and their other the open terminations, being on the inner surface." The characters of the specimen noticed p. 125 of the same volume accord very much with those of our fossil. "It was originally of a funnel-form, but has the appearance of having suffered compression, the sides of the cone being brought nearly within half an inch of each other. The texture of the external surface appears to have been very close, and without any openings, except the very minute foramina resulting from a spongy texture. The internal surface differs much from the external, being so remarkably smooth and regular as to have the appearance of the pile of velvet. On being viewed with a lens, it is seen that the villous appearance is produced by the infinite number of minute openings, arranged as close by each other as possible over the whole surface."—The fossil represented in the frontispiece of the same book bears a striking resemblance to the *Alcyonium Chonoides*. It is, however, impossible to decide as to the identity of these fossils, without an actual inspection of the different specimens.

The annexed sketches, it is hoped, will satisfactorily prove, that nothing has been advanced respecting the structure and physiology of the *Alcyonium Chonoides* which is not fully authorized by its fossil remains. The substance of the reliquiae is generally either calcareous or siliceous; sometimes it consists of an intermixture of both.

The specimens are from Bridgewick chalk-pit, near Lewes.

DESCRIP-

DESCRIPTION OF THE PLATES.

TAB. XXVII.

Fig. 1. *Alcyonium Chonoides*, partly expanded.

a. The tubuli arising from the outer, and terminating on the inner surface.

b. Foramina through which the radicle fibres passed. The muscular coat is not seen in this specimen; the siliceous matter which fills up its funnel-like cavity having enveloped the external surface.—A fragment of an *Echinus* is attached to the stirp, near the base.

2, 3. Flints deriving their forms from the inferior part of the stirp: *vide* Tab. XXVIII. Fig. 2.

4. Resembles figure 1. The cavity is nearly filled with silex; some of the tubular openings are visible on the internal surface.

5. Horizontal section of a flint, showing the thickness of the integuments near the base.

TAB. XXVIII.

These rare and interesting specimens beautifully illustrate the origin of the siliceous fossils delineated in the preceding plate.

Fig. 1. A mass of chalk, bearing on its superior surface the impression of the fibrous integument of *Alcyonium Chonoides*. In the centre is imbedded a flint of a funnel-shape, its margin and base possessing an appearance similar to those of the fossils before mentioned. The same description applies to Fig. 2, with this exception, that the upper part of the flint is less expanded than in Fig. 1., and assumes more of a cyathiform figure. The difference

rence of form observable in these flints doubtless originated from the infiltration of a greater or less proportion of silex. Thus, had the *Alcyonium*, Fig. 1. been more contracted, and the siliceous matter in sufficient quantity to impregnate the whole mass and fill up the ventricular cavity, the flint would have resembled Fig. 1. and 4. of Tab. XXVII. In Fig. 2. at *a* are shown the radicle processes passing from the base of the flint into the surrounding chalk.

TAB. XXIX.

A chalk specimen exhibiting the disciform figure of the animal when completely expanded, and the reticulated structure of its external muscular coat.

Tab. XXX.

A chalk specimen displaying the openings of the tubuli on the surface of the ventricular cavity, the animal being in a state of dilatation.

Specimens in a state of contraction strikingly resemble in form the sponge figured in Ellis's *Zoophytes*, tab. lix. fig. 2: this, together with fig. 1 and 3 of the same plate, are described by Mr. Ellis as "Sponges from Otaheite;" and it is a remarkable circumstance, that the appearance of their external surface is very similar to that of the *Alcyonium Chonoides*. The discovery of more perfect specimens, either recent or fossil, may probably at some future period enable us to trace with greater success the relation they bear to each other.

Although I dare not flatter myself that the preceding observations will add much to oryctological science, yet, as it is of the first importance that we should be extremely accurate in our reference of fossils to their prototypes, it is humbly presumed, that an attempt to prove the identity of specimens which had formerly

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